## REMARKS

### Claim Status

Claims 1-10 and 13-30 are now currently pending, with claims 1 and 13 being in independent form. Claims 11 and 12 have been canceled. Claims 1 and 13 have been amended to incorporate the subject matter of canceled claims 11 and 12. Claims 29 and 30 have been added. Additional support for the amendment to independent claims 1 and 13 may be found, for example, at pg. 9, lines 22-38 of the specification as originally filed. Support for new dependent claims 29 and 30 may be found at pg. 7, lines 5-22 of the instant specification. No new matter has been added. Reconsideration of the application, as herein amended, is respectfully requested.

### Overview of the Office Action

Claims 1-14 and 16-28 stand rejected under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 6,287,882 ("*Chang*") in view of U.S. Patent No. 5,453,394 ("*Yonehara*"). Claim 15 stands rejected under 35 U.S.C. §103(a) as unpatentable over *Yonehara* in view of U.S. Patent No. 6,740,604 ("*Kelly*").

Applicants have carefully considered the Examiner's rejections and the comments provided in support thereof. For the following reasons, Applicants assert that all claims now presented for examination in the present application are patentable over the cited art.

### Patentability of the Independent Claims under 35 U.S.C. §103(a)

Independent claim has been amended to incorporate the subject matter of dependent claims 11 and 12 (now canceled). That is, independent claim 1 has been amended to recite, *inter*

*alia*, "a metallic mirror layer is arranged between the thin-film semiconductor body and the carrier, and wherein a dielectric layer is at least partially arranged between the thin-film semiconductor body and the metallic mirror layer". Independent claim 1 thus recites that a metallic mirror layer is arranged between the thin-film semiconductor body and the carrier, and that a dielectric layer is at least partially arranged between the thin-film semiconductor body and a metallic mirror layer. That is, independent claim 1 defines an optoelectronic semiconductor component with a combined dielectric and metallic layer mirror. Independent claim 13 has been amended to recite corresponding method steps. Additional support for the amendment to independent claims 1 and 13 may be found, for example, at pg. 9, lines 22-38 of the instant specification. Accordingly, no new matter has been added.

The combination of the cited art fails to teach or suggest independent claim 1 as now amended, as well as correspondingly amended independent claim 13.

*Chang* relates to a light-emitting diode having a metal-coated permanent substrate 44. *Chang* (col. 4; FIG. 4A) teaches that an LED structure 41 is grown on a temporary substrate 42. A metal bonding agent 43 is applied on the permanent substrate 44. The temporary substrate 42 along with the LED 41 is then thermally processed and connected to the permanent substrate with the aid of the metal bonding agent 43. *Chang* thus teaches the connection between the permanent substrate 44 and the LED 41 is achieved by the metal bonding agent 43. Here, the metal bonding agent 43 is in direct contact with both the LED 41 and the permanent substrate 44. The temporary substrate 42 is then subsequently removed.

As defined by independent claims 1 and 13, both a (reflective) metallic mirror layer and a (reflective) dielectric layer are arranged between the permanent carrier and the thin-film semiconductor body. *Chang* fails to teach or suggest anything whatsoever about a dielectric layer

that is arranged between the metal bonding agent 43 and the LED structure 41 depicted in FIG. 4A. *Chang* thus fails to teach or suggest independent amended claim 1, as well as the features correspondingly recited in amended independent method claim 13.

*Yonehara*, on the other hand, relates to techniques associated with silicon-on-insulators. *Yonehara* (col. 7, lines 1-45; FIG. 1) teaches that an insulating layer 102 is applied on a first substrate 101. *Yonehara* teaches that a viscose flow-promoting layer 103 is formed by adding a boron or phosphorous impurity into a part of the insulating layer 102, where the insulating layer 102 is a thermally oxidized film originating from the substrate 101. *Yonehara* additionally teaches that the insulating layer 102 particularly comprises silicon dioxide. *Yonehara* further teaches that the first substrate 101 is bonded to a second substrate 110 by aid of the viscose flow-promoting layer 103.

*Yonehara*, however, fails to teach or suggest the arrangement of a metallic mirror layer between the substrates 101, 110. *Yonehara* thus fails to teach or suggest a reflective metallic layer and, accordingly, fails to teach or suggest a dielectric conductive layer arranged between the substrates for connection to each other. The combination of *Chang* and *Yonehara* thus fails to teach amended independent claim 1, as well as the features correspondingly recited in amended independent claim 13, because *Yonehara* fails to provide what *Chang* lacks.

Within the context of the teachings of *Yonehara*, the dielectric layer 102 that serves as a bonding layer is very thin and created by thermally oxidizing the substrate 101 (see, e.g., col. 7, lines 8-14, col. 8, lines 55-56 and col. 13, lines 48-54). Thus, in accordance with the teachings of *Yonehara*, the dielectric layer must be in direct contact with the substrate, because the dielectric layer 102 originates from the substrate 101 itself. Moreover, the viscous flow-promoting layer 103 that forms part of the insulating layer 103 must be in direct contact with the body to form a

connection thereto. If this arrangement is not met, then it would not be possible to apply the method of *Yonehara* to the disclosed structure in the manner described.

Consequently, the insulating layer 102, 103 disclosed in the *Yonehara* device must be in direct contact with the substrate 101 and a body to form the connection. According to *Yonehara*, however, the use of an intermediate layer as a metallic layer is not applicable, especially not between the substrate 101 and the insulating layer 102, 103. *Yonehara* thus teaches away from arranging a metallic layer in this location. The skilled person would therefore have no reason to create a device that would encompass the subject matter of amended independent claims 1 and 13, where the dielectric layer is arranged between the thin-film semiconductor body and the metallic layer, even in view of the combined teachings of *Chang* and *Yonehara*.

Moreover, the skilled person knows that the dielectric layer recited in amended independent claims 1 and 13, when used as a reflective layer, operates by total reflection. *Yonehara* teaches that a viscose flow-promoting layer 103 is generated on the insulating layer 102. Without this flow-promoting layer 103, however, the bonding method of *Yonehara* would not work. *Yonehara* (col. 7, lines 27-37 and col. 10, lines 51-54) teaches that the viscosity of the flow-promoting layer 102 is realized by heavily doping part of the insulating layer 102 by boron or phosphorous implantation. The skilled person appreciates that doping with boron and phosphorous raises a refractive index of, e.g., the silicon dioxide of the layer 102, 103.

In contrast, the reflective dielectric layer of amended independent claims 1 and 13 operates by total reflection. Consequently, an increase in a refractive index would decrease the efficiency of the dielectric reflective layer, because an angular range in which total reflection occurs would be decreased. The skilled person would therefore avoid the use of the boron or phosphorous doped insulation layer of *Yonehara* for such a mirror, i.e., the dielectric mirror

recited in claims 1 and 13. It is therefore apparent that the teachings of *Chang* in view of the teachings of *Yonehara* would not provide the skilled person with a reason to create a device having a combined dielectric and metallic reflective layer as recited in amended independent claim 1, and correspondingly recited in amended independent method claim 13.

The combined teachings of *Chang* and *Yonehara* thus fail to achieve a device that combines a dielectric layer with a metallic reflective layer in the manner recited in amended independent claims 1 and 13. The subject matter of amended independent claims 1 and 13 is therefore not rendered obvious by *Chang* and *Yonehara*.

The Examiner has also cited *Kelly* (USP 6,740,604), *McCarthy* (USP 5,674,758) and *Soref* (USP 5,838,870) to support his asserted known desirability to utilize SOI platforms with optoelectronic integrated circuits (see pg. 4 of the Office Action). However, none of these references teach or suggest anything whatsoever about a combined dielectric and metallic mirror or a substrate comprising germanium. Therefore, *Kelly*, *McCarthy* and *Soref* fail to cure the deficiency of the combination of *Chang* and *Yonehara*.

Independent claim 1 and 13 are, accordingly, patentable over the cited art. Reconsideration and withdrawal of the rejection of claims 1 and 13 under 35 U.S.C. §103 are requested.

**Dependent Claim 15**

The Examiner (at pg. 3 of the Office Action) acknowledged that *Yonehara* fails to teach or suggest "the use of laser irradiation to strip the TFS body [from] the carrier," as recited in dependent claim 15, and cites *Kelly* for this feature. Applicants disagree that the combination of *Yonehara* and *Kelly* teaches the claimed invention.

*Kelly* discloses a method for separating two layers of material such that the two separated layers of material are essentially preserved (see Abstract). However, *Kelly* fails to explicitly teach or suggest an optoelectronic semiconductor. *Kelly* thus fails to teach or suggest the optoelectronic semiconductor as defined by amended independent claims 1 and 13.

The combination of *Yonehara* and *Kelly* therefore fails to teach or suggest the features recited in independent claims 1 and 13, let alone in dependent claim 15. Dependent claim 15 is, accordingly, patentable over *Yonehara* and *Kelly*. Reconsideration and withdrawal of the rejection of claim 15 under 35 U.S.C. §103 are requested.

In view of the patentability of independent claims 1 and 13, for the reasons presented above, each of the dependent claims 2-10 and 14-28, as well as new dependent claims 29 and 30, is patentable therewith. Moreover, each of these claims includes features which serve to even more clearly distinguish the invention over the applied references.

For example, newly added independent claims 29 and 30 each recite a gold-germanium-eutectic is formed between the thin-film semiconductor body and the carrier. The cited art fails to teach or suggest this limitation. Dependent claims 29 and 30 are therefore patentable for this additional reason.

**Conclusion**

Based on all of the above, it is respectfully submitted that the present application is now in proper condition for allowance. Prompt and favorable action to this effect and early passing of this application to issue are respectfully solicited.

Should the Examiner have any comments, questions, suggestions or objections, the Examiner is respectfully requested to telephone the undersigned in order to facilitate reaching a resolution of any outstanding issues.

Respectfully submitted,
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By _____

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